QUALITY ASSURANCE PROJECT PLAN

ESE Leoti, Kansas Facility

Prepared for:
ESE Alcohol Inc.

January 2023

Project Personnel Approval Sheet

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Contents

1. Introduction

1.1 Project Overview

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the sampling and analyses for determining the nature and extent of selected pesticide contamination in sludges and soils from the ESE Alcohol, Inc (ESE) facility in Leoti, Kansas (KS).

This QAPP has been prepared using the United States Environmental Protection Agency (USEPA) guidance (USEPA, 2006a). QA/QC procedures have been based on applicable USEPA requirements, laboratory standard operating procedures, and technical standards.

1.1.1 QAPP Update/Modification

Following approval, a copy of the final QAPP will be distributed to all parties on the distribution list. This QAPP may require periodic updates or modifications when new phases of work are performed or modifications to the data collection protocols are otherwise required. Under such circumstances, a new version of the QAPP, with a date of publication, will be provided to all project personnel on the distribution list. When a modified/revised QAPP is distributed, a cover letter will be prepared and accompany the document to describe, in detail, modifications to the original QAPP.

The QAPP has been prepared in conjunction with a Sampling and Analysis Plan (SAP), which is included in this QAPP by reference.

1.2 Project Schedule

The schedule for completion of each task is presented in the SAP, prepared for that task.

1.3 Distribution List and Project Personnel Approval Sheet

The signed Approval Sheet at the front of this QAPP will serve as the Distribution List and Project Personnel Approval Sheet. The QAPP, and any subsequent revisions, will be distributed to the personnel shown on the Approval Sheet.

1.3.1 Acronyms and Abbreviations

%R – Percent Recovery
%D - Percent Differrence
CCV – Continuing Calibration Verification
COC – Chain-of-Custody
CPC - Company Project Coordinator
CSM – Conceptual Site Model
DQO – Data Quality Objectives
EPA - U.S. Environmental Protection Agency
EDD – Electronic Data Deliverable
FD – Field Duplicate
ICV – Initial Calibration Verification
IDW – Investigation-Derived Waste
LC/MS/MS – Liquid Chromatography/Tandem Mass Spectrometry

LCS – Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
LOQ – Limits of Quantitation
MS – Matrix Spike
MSD – Matrix Spike Duplicate
QA/QC – Quality Assurance/Quality Control
QAPP – Quality Assurance Project Plan
QSM – Quality Systems Manual
RPD – Relative Percent Difference
SAP – Sampling and Analysis Plan
SOP – Standard Operating Procedure
USEPA – United States Environmental Protection Agency

1.4 Project/Task Organization

The following responsibilities of key personnel are described below.

1.4.1 Management Responsibilities

1.4.1.1 Project Coordinator

The Project Coordinator (PC), Scott Kettman, will be responsible for implementing the project and has the authority to commit the resources necessary to meet project objectives and requirements. All communication and reporting will be conducted through the PC or the designee of the PC. The PC has the primary responsibility for overseeing the performance of response activities pursuant to requests from EPA.

1.4.1.2 Project Manager

The Project Manager, Terry D. Bobo, is responsible for establishing project scope and objectives, schedule, and for communicating to the Task Managers. The Project Manager is responsible for assuring that projects are properly staffed, personnel are properly trained, the technical direction of the project, and the quality of the work. The Project Manager is also responsible for maintaining the project files. The Project Manager may discuss methodologies and requirements with regulatory personnel and will maintain clear lines of communication with the PC.

1.4.1.3 Task Managers

Each work plan will have a Task Manager, to be determined (TBD), that will serve as the lead for that task. Each Task Manager is responsible for overseeing the day-to-day activities associated with his/her task. The Task Manager is responsible for implementation of the SAP. This individual will oversee sample collection teams, review field documentation and sample submission to laboratories, and lead and coordinate the day-to-day activities of the various sample teams under their supervision. This individual will identify problems at the field level, resolve issues in consultation with the SAP, implement and document corrective action procedures, and maintain communication with the field team and upper management. The Task Manager will also address any chain of custody discrepancies.

1.4.1.4 Project Chemist

The Project Chemist, David Hooper, is responsible for developing, in conjunction with the individual Task Managers, analytical specifications (i.e., analyte lists, detection limits, methods) and communicating the specifications to the laboratory. The Project Chemist is also responsible for:

- Interfacing with the laboratory to monitor progress and to resolve any data quality issues.

- Communicating issues that could potentially adversely impact the quality of the data and achievement of task objectives to the Task Manager.
- Serving as a resource to the Field Team Leader (FTL) and field team.
- Oversee the data review/validation process.

1.4.2 Quality Assurance Responsibilities

1.4.2.1 Project QA Officer

The Project QA Officer has the overall responsibility for quality assurance. The Project QA Officer communicates directly to the Project Manager on matters pertaining to QA, data validation, and laboratory analyses. Specific responsibilities include:

- Reviewing and approving the QAPP.
- Reviewing and approving QA procedures, including any modifications to existing approved procedures.
- Ensuring that QA audits of the various phases of the project are conducted as required by this QAPP.
- Providing technical assistance to project staff.
- Ensuring that data review/validation is conducted in accordance with the QAPP.
- Reporting on the adequacy and efficiency of the QA Program, including field sampling and laboratory analyses, to the Project Manager and recommending corrective actions, if necessary.

1.4.2.2 Data Reviewer

The Data Reviewer reports to the Project Chemist. The Data Reviewer is responsible for reviewing and/or validating the analytical data in accordance with the QAPP.

1.4.3 Laboratory Responsibilities

Laboratories involved will analyze samples collected during execution of the various tasks conducted under this program per the SAP. The laboratories that will be utilized are identified in **Section 2.5**. Responsibilities of key laboratory personnel are described below.

1.4.3.1 Laboratory Director

The Laboratory Director is ultimately responsible for the data produced by their laboratories. Specific responsibilities include:

- Allocating resources to specific projects and providing sufficient staffing, equipment, and support.
- Overseeing the technical operations' Section Managers and the Laboratory QA Manager.

1.4.3.2 Section Manager

The individual Laboratory Section Managers report to the Laboratory Director either directly or through the Operations Manager. Specific responsibilities include:

- Supervision of employees within their specific analytical area.
- Overseeing and supporting the development, implementation, and operation of analytical technical programs.

- Coordinating sample flow and for implementing QA and quality control (QC) activities in their area of authority.
- Working in conjunction with the Laboratory QA Manager to ensure that QA/QC recommendations are reviewed and that corrective actions are implemented and effective.

1.4.3.3 Laboratory QA Manager

The Laboratory QA Manager reports to the Laboratory Director. Specific responsibilities include:

- Monitoring the QA and QC activities of the laboratory to ensure conformance with authorized policies, procedures, and good laboratory practices, and recommending improvements as appropriate.
- Informing specific Section Managers of noncompliance with the approved QA/QC criteria.
- Ensuring that all records, logs, Standard Operating Procedures (SOPs), project plans, and analytical results are maintained in a retrievable fashion.
- Ensuring that SOPs and other controlled documents are distributed to all appropriate laboratory personnel for use in the project.

1.4.3.4 Laboratory Project Manager or designated coordinator

The Laboratory Project Manager is ultimately responsible for all laboratory analyses and is the primary point of contact for issues surrounding this QAPP, including resolving technical problems, modifications to SOPs, etc. The Laboratory Project Manager is responsible for the coordination of routine day-to-day project activities including project initiation, status tracking, data review and requests, inquiries and general communication related to the project. Final approval of data reports is the responsibility of the Laboratory Project Manager.

The Laboratory Project Manager is the primary point of contact between the laboratory and Environmental Management Inc. Specific responsibilities of the Laboratory Project Manager include:

- Monitoring analytical and QA project requirements for a specified project.
- Acting as a liaison between Project Chemist and the laboratory staff.
- Reviewing data packages for completeness and compliance to the project requirements.
- Monitoring, reviewing, and evaluating the progress and performance of projects.
- Providing all analytical deliverables to the Project Chemist in a timely manner.

1.4.3.5 Laboratory Staff

Laboratory staff includes the Laboratory Director, the Laboratory Supervisor, Section Managers, Group Leaders, Chemists, and Technicians. These individuals are responsible for the actual preparation, analysis, reporting, and reviewing of the analytical information. The analysts are responsible for understanding and implementing SOPs and for conformance with the QA Program. Analysts are also responsible for the initial review of data that they generate during the analytical process and the identification of nonconforming events within their scope of concern. These individuals, in conjunction with laboratory management and the Laboratory QA Manager, may also be responsible for implementing corrective actions.

1.4.3.6 Sample Receipt Personnel

Sample receipt personnel, or sample custodians, are responsible for the initial assessment of samples, including documentation of sample conditions upon receipt, and accuracy and clarity of requests on the Chain-of-Custody (COC) forms that accompany the samples. Sample receipt personnel, along with laboratory management, are responsible for the resolution and

documentation of any issues associated with the initial assessment of the sample integrity on arrival. Resolution may include discussions with laboratory personnel, client contacts, and/or laboratory management.

Following the initial assessment, sample receipt personnel are responsible for the accurate input of sample information into the data management system and the assignment of individual sample identifiers. Sample receipt personnel also initiate the internal COC process and begin laboratory tracking.

1.4.4 Field Responsibilities

1.4.4.1 Field Team Leader

The FTL has overall responsibility for completion of all field activities in accordance with the SAP, work plans, and QAPP and is the communication link between the Task Manager and the field team. Specific responsibilities of the FTL include:

- Coordinating activities in the field.
- Assigning specific duties to field team members.
- Mobilizing and demobilizing of the field team and contractors to and from the site.
- Directing the activities of contractors on site.
- Resolving any logistical problems that could potentially hinder field activities, such as equipment malfunctions or availability, personnel conflicts, or weather dependent working conditions.
- Implementing field QC including issuance and tracking of measurement and test equipment; the proper labeling, handling, storage, shipping, and COC procedures used at the time of sampling; and control and collection of all field documentation.

1.4.4.2 Field Staff

The field staff reports directly to the FTL. The responsibilities of the field staff include:

- Collecting samples, conducting field measurements, and decontaminating equipment according to documented procedures stated in the SAP.
- Ensuring that field instruments are properly operated, calibrated, and maintained, and that adequate documentation is kept for all instruments.
- Collecting the required QC samples and thoroughly documenting QC sample collection.
- Ensuring that field documentation and data are complete and accurate.
- Communicating and documenting any nonconformance or potential data quality issues to the FTL as well as documenting subsequent corrective action and effectiveness of corrective action.

1.4.4.3 Drilling and Surveying Contractors

Although not part of the current SAP, contractors under oversight may perform drilling and surveying activities under this program. The contractors are responsible for conducting the work in accordance with the SAP and contractual agreements and for communicating any issues concerning the budget, schedule, or achievement of the technical specifications to the FTL and/or Task Manager.

1.5 Problem Definition and Background

ESE owns an ethanol production facility located at 310 East Highway 96 in Leoti, Kansas. Ethanol was produced at the facility utilizing unused seed received from off-site sources as a feedstock, and the manufacturing process produces both solid and liquid byproducts. Solid byproducts have been applied to the adjacent agricultural fields via no-till methods as fertilizer/soil conditioner while the liquid byproducts have been sprayed onto the fields for irrigation. The primary production facility is on an approximately 30-acre property and adjacent fields potentially influenced by activities at ESE are approximately 2,600 acres in extent.

Since 2020, some of the feedstock used at the ESE site for ethanol production has included unused seed from Pioneer Hi-Bred, a wholly owned subsidiary of Corteva, a portion of which was treated with pesticides (including neonicotinoids). Seed treatments are used to reduce the potential for soil-borne diseases and damage from insects and other pests. The United States Environmental Protection Agency (EPA) Region 7 has expressed concern that pesticides originally applied to the treated seed may still be present in the solid and liquid byproducts from the site's ethanol manufacturing process and could be transferred to the agricultural fields through the land application and irrigation activities. Therefore, EPA Region 7 issued an Administrative Order on Consent (AOC) to ESE on November 2, 2022 to develop a SAP to determine if recent land application and irrigation activities completed at the site have caused pesticides to be present in shallow soil at concentrations exceeding applicable human health and ecological screening criteria. As specified in Part I.1.f of the AOC Attachment, the SAP must include a QAPP and this document fulfills that requirement.

1.6 Project/Task Description

The scope of the sampling program is described in detail in the SAP being submitted concurrently with this QAPP.

1.7 Quality Objectives and Criteria for Measurement Data

1.7.1 Data Quality Objectives

The program will consist of sampling programs and chemical analyses of biosolids and soils. The sampling and analysis programs incorporate the following QA elements:

- A sampling program designed to obtain sufficient data to determine levels of COPCs in media of interest.
- The use of sample collection and handling procedures that will ensure the representativeness and integrity of the samples.
- An analytical program designed to generate definitive data of sufficient quality and sensitivity to meet the project objectives (see **Section 1.7.2**).
- Data deliverables that will allow verification and validation of the data and reproducibility of the reported results.

The designs of the program were based on the Data Quality Objective (DQO) process (U.S. EPA, 2006), a multi-step, iterative process that ensures that the type, quantity, and quality of environmental data used in decision-making is appropriate for its intended application. The DQOs associated with the program are summarized in *Section 3.1* of this QAPP.

Specific objectives associated with each task will be included in the individual SAPs. Other matrices may be added depending on project objectives.

1.7.2 Data Quality Objectives for Measurement Data

The principal objectives of the QAPP pertain to the collection of data that are sufficient to evaluate the possible presence of COPCs in the media of interest. The quality of the data gathered in this project can be defined in terms of the following elements: precision, accuracy, completeness, sensitivity, and representativeness. These elements are discussed below.

1.7.2.1 Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates at a rate of one duplicate per 20 field samples as a minimum. Precision will be measured through the calculation of relative percent difference (RPD).

Precision in the laboratory is assessed through the calculation of RPD for field duplicate samples, or as laboratory duplicates, depending on the method. Precision control limits for laboratory analyses are provided in **Appendix A**.

1.7.2.2 Accuracy

Accuracy is the degree of agreement between the observed value and an accepted reference or true value. Accuracy in the field is assessed through the use of equipment rinsate blanks and through the adherence to all sample handling, preservation, and holding time requirements. Equipment rinsate blanks will be collected at a rate of one per 20 samples or one per day, whichever is less, per sampling event when sampling equipment that requires decontamination is reused. If sample specific dedicated equipment is used a representative field blank will be collected to verify the sampling equipment is free of COPCs. The objectives for equipment rinsate blanks are presented in **Appendix A**.

Laboratory accuracy is assessed through the analysis of method blanks, laboratory control samples (LCS), matrix spike and matrix spike duplicates (MS/MSDs), surrogate compound recoveries. Accuracy control limits are given in **Appendix A**.

1.7.2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of valid samples obtained during the execution of each task. The field completeness objective for each task is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. The laboratory completeness objective is greater than 95 percent for each matrix.

1.7.2.4 Representativeness

Representativeness is the extent to which the sampling design adequately reflects the environmental conditions of the site. The data will be considered representative of the site if all sampling and analysis activities are conducted according to the SAP, task work plans, and QAPP.

1.7.2.5 Sensitivity

Sensitivity of analytical data is demonstrated by the laboratory method reporting limits (MRLs) also called limits of quantitation (LOQ). Results below the MRL/LOQ will not be reported. The target LOQs for the constituents to be analyzed are presented in **Appendix A**.

1.8 Special Training/Laboratory Operations

1.8.1 Training

Field personnel will be experienced in the sampling and measurement techniques proposed in the task work plans and described in the SAP. Qualified contractors will be used for drilling, surveying, and waste hauling activities as necessary. Additionally, prior to starting work, personnel will be given instruction specific to the task, covering the following areas:

- Organization and lines of communication and authority
- Overview of the SAP
- QAPP requirements
- QA/QC requirements
- Documentation requirements
- Health and safety requirements

Instructions will be provided and documented by the Task Manager, FTL, and/or Project QA Officer.

Personnel responsible for shipping samples will also be trained in the appropriate regulations (e.g., Department of Transportation (DOT), International Civil Aviation Organization (ICAO), and International Air Transport Association (IATA)).

1.8.2 Laboratory Operations

The laboratory must be ISO17025 certified. Certified laboratories must maintain documentation that describes or identifies in detail the processes and procedures used to ensure data produced under this QAPP is scientifically sound, including but not limited to sample receipt, storage, analysis, reporting, and disposal.

1.9 Documents and Records

1.9.1 Project Files

The project files will be the central repository for all documents which constitute evidence relevant to sampling and analysis activities as described in this QAPP. The custodian of the project files will maintain the contents of the project files for the investigations, including all relevant records, reports, logs, field notebooks, pictures, contractor reports, and data reviews in a secured, limited access area and under custody of the Project Manager for a period of up to 10 years.

The project files will include at a minimum:

- Digitally captured field data
- Field logbooks
- Field data and data deliverables
- Photographs
- Drawings

- Sample collection logs
- Laboratory data deliverables
- Data review/validation reports
- Data assessment reports
- Progress reports, QA reports, interim project reports, etc.
- All custody documentation (chain-of-custody [COC] forms, airbills, etc.)

Electronic versions of correspondence, reports, drawings, and statistical analyses will be stored in the project-specific network file. The original electronic data deliverables (EDDs) received from the laboratories, and the project database, will also be stored on the network, which is backed up daily and periodically archived off-site in accordance with consultants Information Management policy.

1.9.2 Field Records

Documentation of field activities is described in the SAP.

1.9.3 Laboratory Records and Deliverables

Laboratory data reduction procedures will be performed according to the protocols required by ISO17025 certification..

Data deliverables for chemical analyses will be provided within turnaround times necessary to meet the objectives of the individual task. The turnaround time will be communicated to the laboratory on a task basis. The laboratory will provide at least one copy of the analytical report (as a bookmarked pdf format file) The analytical report will include at a minimum the following information:

- Analytical report cover page.
- COC information.
- A narrative explaining any deviations from normal procedure or analytical problems.
- Sample results, including units.
- Reporting limits, including units.
- Results for method or preparation blanks, laboratory control sample results, matrix spike and matrix spike duplicate recoveries and precision, and surrogate recoveries.

2. Measurement/Data Acquisition

2.1 Sampling Process Design

The rationale for sample design is provided in the SAP.

2.2 Sampling Methods Requirements

2.2.1 Field Measurements

Field measurements may be taken in conjunction with field sampling tasks. The measurements may include visual observations, and Global Positioning System (GPS) coordinates of sample locations. The SOPs for these measurements are included in the SAP.

2.2.2 Sampling Procedures

The SOPs that will be utilized for sampling of soil and biosolids are included in the SAP.

A summary of sample container, preservation, and holding time requirements is presented in **Appendix B**.

2.2.3 Cleaning and Decontamination of Equipment/Sample Containers

The procedures for equipment decontamination are included in the SAP.

2.2.4 Inspection and Acceptance Requirements for Supplies/Sample Containers

For this project, critical supplies for field activities will be tracked by the Field Team in the following manner.

Critical Supplies and Consumables	Inspection Requirements and Acceptance Criteria	Responsible Individual
Sample bottles	Visually inspected upon receipt for cracks, breakage, and cleanliness. Must be accompanied by certificate of analysis.	FTL
Chemicals and reagents	Visually inspected for proper labeling, expiration dates, appropriate grade.	FTL
Sampling equipment	Visually inspected for obvious defects, damage, and contamination.	FTL
Field measurement equipment	Functional checks to ensure proper calibration and operating capacity.	FTL

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective action. Corrective measures may include repair or replacement of measurement equipment, and/or notification of vendor and subsequent replacement of defective or inappropriate materials. All actions will be documented in the project files.

2.3 Management of Investigation-Derived Waste

Investigation-derived waste (IDW) may include spent decontamination solutions and solid materials such as soil/sediment cuttings and personal protective equipment. Management of IDW is discussed in the SAP.

2.4 Sample Handling and Custody

2.4.1 Sample Containers, Preservation, and Holding Times

Sample bottles and chemical preservatives will be provided by the laboratory. The containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers* (U.S. EPA, 1992a). Certificates of analysis will be retained with each lot of containers and maintained on file to document conformance to U.S. EPA specifications, or documented per the laboratory's sample container QC program. The laboratory will be responsible for maintaining the certificates of analysis for the sample containers.

A summary of sample container, preservation, and holding time requirements for the samples to be collected for this project is presented in **Appendix B**.

2.4.2 Sample Labeling

Immediately upon collection, each sample will be labeled with an adhesive label. Samples will be assigned unique sample identifications (IDs) as described in the SAP.

The sample identification code will be recorded on the sample label, in the field logbook/sample collection form, on the COC form, and will be carried through the analytical process to reporting.

2.4.3 Custody Procedures

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in two parts: field sample collection and laboratory analysis.

A sample is considered to be under a person's custody if any of these conditions are met:

- The item is in the actual possession of a person.
- The item is in the view of the person after being in actual possession of the person.
- The item was in the actual physical possession of the person but is locked up to prevent tampering.
- The item is in a designated and identified secure area.

2.4.3.1 Field Custody Procedures

The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

All sample containers will be identified by the use of adhesive sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in the SAP. Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation

would explain that a pencil was used to fill out the sample label because the pen would not function in freezing weather.

Samples will be accompanied by a properly completed COC form. The sample numbers and locations will be listed on the COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to the permanent laboratory, or to/from a secure storage location. Detail procedures on COC are included in the SOP included in of the SAP. Details from the COC and the field sample sheets will also be entered into an EDD file using EDGE. Once the EQuIS EDD is received from the lab all of these fields are merged into the database.

All sample shipments will be accompanied by the COC record identifying the contents. The original record and a copy will accompany the shipment, and a copy will be retained by the sampler and placed in the project files.

Samples collected for analysis must not exceed 10°C after collection and until laboratory receipt. Sample temperature must be confirmed to be at or below 10°C when the samples are received at the laboratory.

Samples will be properly packaged on ice at 10°C or below for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to opposite corners (front and back) of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations. The SOP on sample packaging and shipping, included in the SAP, includes a detailed description of these procedures.

If the samples are sent by common carrier, the waybill will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

Whenever possible, samples will be transported to the laboratory the same day the samples are collected. Shipment will be via commercial overnight carrier.

2.4.3.2 Laboratory Custody Procedures

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will:

- Examine the shipping containers to verify and document that the custody tape is intact.
- Examine all sample containers for damage.
- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the COC form.
- Compare samples received against those listed on the COC.
- Verify that sample holding times have not been exceeded.
- Examine all shipping records for accuracy and completeness.
- Determine sample pH (if applicable) and record on COC or in sample receipt records.
- Sign and date the COC immediately (if shipment is accepted) or identify the carrier's shipment tracking information on the COC.

- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting the client.
- Attach laboratory sample container labels with unique laboratory identification and test.
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory information management system (LIMS). At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The appropriate laboratory personnel will be notified of sample arrival.
- The completed COC, waybills, and any additional documentation will be placed in the project file.

Specific details of laboratory custody procedures for sample receiving, sample identification, sample control, record retention, and data purging to the final evidence file are described in the laboratory SOPs.

2.5 Analytical Methods

Chemical analyses of samples may be performed by several laboratories, including but not limited to:

Matrix Sciences Pacific Agricultural Laboratory
21830 SW Alexander Lane
Sherwood, OR 97140

2.5.1 Laboratory Analytical Procedures

The laboratory SOPs for sample preparation and analysis are based primarily on elements derived from:

- EPA Method 8321 Modifed: Solvent-Extractable Nonvolatile Compounds by High Performance Liquid Chromatography/ Tandem Mass Spectrometry (HPLC/MS/MS)
- AMVAC Method, WRC 88-43: MITC Analysis in Various Crops

Nominal laboratory LOQs are included in **Appendix A**.

2.5.2 List of Project Target Analytes and Detection Limits

A complete listing of target compounds and LOQs can be found in **Appendix A**.

2.5.3 List of Associated Quality Control Samples

The analytical laboratory SOPs include a QC section which addresses the minimum QC requirements for the analysis of specific analyte groups. The types of QC samples are described in **Section 2.6.1**.

2.6 Quality Control

QC is the overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements. Acceptable limits of performance are defined for each QC check and sample used in the project.

2.6.1 Field

QC samples may include, field blanks, equipment rinsate blanks, field duplicates, and MS/MSD samples. These samples will be collected as described below.

2.6.1.1 Equipment Blanks

Equipment blanks will be prepared by passing laboratory grade water through non-disposable or non-dedicated sampling equipment after equipment decontamination and before field sample collection. Equipment blanks will be collected for all solid samples collected with non-disposable or non-dedicated equipment and will be collected at a frequency of one per 20 samples, or one per day, whichever is less, collected using a particular type of equipment. Equipment blanks will be analyzed for the same chemical parameters as their associated samples.

2.6.1.2 Field Duplicates

Field duplicates will be collected at a minimum frequency of one field duplicate for every 20 investigative samples. All field duplicates will be analyzed for the same chemical parameters as their associated samples.

2.6.1.3 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS/MSD samples will be collected at a minimum frequency of one for every 20 investigative samples. Sufficient additional volume (based on the laboratory's requirements) will be required.

2.6.2 Analytical Quality Control Checks

Each laboratory performing chemical analyses has a QC program in place to ensure the reliability and validity of the analysis performed at the laboratory. All analytical procedures are documented in writing as SOPs and each SOP includes a QC section which addresses the minimum QC requirements for the procedure. In general, the QC requirements should include evaluation of the following elements where applicable:

- Method blanks or Laboratory Reagent Blanks.
- Reagent/preparation blanks.
- Instrument blanks.
- LCS and LSD Duplicates (LCSDs)
- MS/MSDs
- Surrogate recoveries.
- Laboratory duplicates.

2.6.3 Laboratory Instrument Preventative Maintenance

As part of their QA manual, a routine preventative maintenance program is conducted by the laboratories to minimize the occurrence of instrument failure and other system malfunctions. Designated laboratory employees regularly perform routine scheduled maintenance and repair

of (or coordinate with the vendor for repair of) all instruments. All maintenance that is performed is documented in the laboratories' operating record. All laboratory instruments are maintained in accordance with manufacturer's specifications. These records should be maintained per the laboratory QA manual.

2.7 Instrument/Equipment Calibration and Frequency

Calibration is required to ensure that laboratory analytical systems are operating correctly and functioning at the proper sensitivity to meet established detection limits.

2.7.1 Analytical Instrumentation

Calibration procedures for laboratory LC/MS/MS instruments will consist of initial calibrations (ICAL) where r^2>0.990, initial calibration verifications (ICV) where %D must be <30%, and continuing calibration verification (CCV) where%D must be <20%. The SOP for each analysis performed in the laboratory describes the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration.

The laboratory maintains documentation for each instrument which includes the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions, and the samples associated with these calibrations.

2.8 Inspection/Acceptance of Supplies and Consumables

Inspection and acceptance procedures for field materials are discussed in this section.

The laboratory system of inspection and acceptance of supplies and consumables includes:

- Approval of purchase orders by the Laboratory Director or Section Managers to ensure that materials and supplies of the appropriate quality are ordered.
- Purchasing of supplies, reagents/chemicals, and bottles through established and approved vendors.
- Inspection of items upon receipt for damage, completeness of the order, and conformance to specifications.
- Logging in of each lot of reagents and verifying the quality through batch analysis.

2.9 Non-Direct Measurements

Non-direct data is considered to be historical reports, maps, and literature searches. The use of this data will be limited to the design of the sampling programs and will not be used for characterization purposes unless those data are shown to meet the project DQOs.

2.10 Data Management

Data management operations include data recording, validation, transformation, transmittal, reduction, analysis, tracking, storage and retrieval.

3. Project Assessment / Oversight

3.1 Assessment and Response Actions

This section identifies the number, frequency, and type of planned assessment activities that will be performed for the project.

3.1.1 Assessments

3.1.1.1 Field Sampling Technical System Audit

The Project QA Officer or designee will be responsible for periodic internal technical surveillance audits (TSAs) to verify that field sampling procedures and field sampling measurements are properly followed. The TSAs will include examination of:

- Field sampling records,
- Sample collection, handling, and packaging procedures,
- QA procedures,
- Chain-of-custody, and
- Sample documentation, etc.

An example of the checklist used during the internal field TSAs is included as **Figure 1** below. Results of internal field TSAs will be documented in reports to the Project Manager.

Figure 1. Example of Internal Field TSA Checklist

Project: **Site Location:** **Auditor:**	
1. Was project-specific training held?	
2. Are copies of project plan (FSP, QAPP) on site and available to personnel?	
3. Are samples being collected in accordance with the project plan?	
4. Do the numbers and locations of samples conform to the project plan?	
5. Are sample locations staked or otherwise marked?	
6. Are samples labeled in accordance with the project plan?	
7. Is equipment decontamination in accordance with the project plan?	
8. Are samples being preserved and containerized in accordance with the project plan?	
9. Are QC samples in accordance with the types, collection procedures, and frequencies specified in the project plan?	
10. Are chain-of-custody procedures and documents in conformance with the project plan?	
11. Are field records complete, accurate, up-to-date, and in conformance to good recordkeeping procedures?	
12. Are modifications to the project plan being communicated, approved, and documented appropriately?	
Additional Comments:	
Auditor:	**Date:**

3.1.1.2 Performance Evaluation Sample Assessment

Continuous performance auditing is accomplished through the regular use of LCS/LCSD samples as positive controls in the laboratory, field QC samples to monitor sampling, proficiency testing, and through continuing calibration verification samples. Federal and State agencies may administer the proficiency testing.

For this program, project-specific Performance Evaluation (PE) or Performance Testing (PT) samples will be added on a task and lab specific basis. PE samples analyzed by the laboratory as part of this process will be reviewed by the Project Chemist and evaluated to ensure the acceptability of results for the parameters and matrices of interest. Any deficiencies will be communicated to the Project Manager, the relevant Task Manager(s), and the laboratory. Corrective actions may include internal laboratory actions, the analysis of additional PE samples, or selection of another analytical subcontractor.

3.1.1.3 Management System Review (MSR)

On a periodic basis, all projects within are reviewed by management. The review includes the following elements:

- Progress towards completion of the scope of work.
- Schedule versus approved plan.
- Costs and invoicing versus approved plan, including adherence to purchasing policy.
- Project task structure and associated budgets.
- Senior review assignments and documentation.
- Compliance with hard copy and electronic file management requirements.
- Client relationship development.
- Future needs.

Documentation of the review will be maintained with the project files.

3.1.2 Assessment Findings and Corrective Action Responses

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out-of-limit QC performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. All corrective action proposed and implemented should be documented in the QA reports to management (**Section 3.2**). Corrective action should only be implemented after approval by the Project Manager, or his/her designee.

3.1.2.1 Field Corrective Action

Corrective action in the field may be needed when the sample frequency is changed (i.e., more/fewer samples, sample locations other than those specified in the SAP), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The FTL will approve the corrective action and notify the Task Manager. The Task Manager will approve the corrective measure. The FTL will ensure that the field team implements the corrective action.

Corrective action resulting from internal field audits will be implemented immediately if data may be adversely affected due to unapproved or improper use of approved methods. The QA auditor will identify deficiencies and recommend corrective action to the FTL. The FTL and field team will perform implementation of corrective actions. Corrective action will be documented in QA reports to the project management team (**Section 3.2**).

Corrective actions will be implemented and documented in the field record book. Documentation will include:

- A description of the circumstances that initiated the corrective action.
- The action taken in response.
- The final resolution.
- Any necessary approvals.
- Effectiveness of corrective action.

No staff member will initiate corrective action without prior communication of findings through the proper channels. If at any time a corrective action issue is identified which directly impacts the project objectives, the EPA will be notified.

3.1.2.2 Laboratory Corrective Action

Corrective action in the laboratory is specified in laboratory SOPs and may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, multiple phases, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or analysis. Following consultation with laboratory analysts and supervisory personnel, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. If the nonconformance causes project objectives not to be achieved, the Project Chemist will be notified, who will in turn notify the project team, who will communicate with the EPA Project Leaders and other members of the project team, as necessary. EPA will also be notified in those cases where the nonconformance affects the achievement of the project DQOs.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and in the narrative data report generated by the laboratory. If the corrective action does not rectify the situation, the laboratory will contact the Project Chemist, who will determine the action to be taken and inform the appropriate personnel.

3.1.2.3 Corrective Action during Data Review, Validation, and Assessment

The need for corrective action may be identified during data review, validation, or assessment. Potential types of corrective action may include resampling by the field team or reinjection/reanalysis of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team and whether the data to be collected are necessary to meet the required QA objectives. If the Data Reviewer identifies a corrective action situation that impacts the achievement of the project objectives, the Project Manager will be responsible for informing the appropriate personnel.

3.2 Reports to Management

QA reports will be prepared on an as-needed basis by the Project QA Officer and submitted to the Project Manager. QA reports will document any problems identified during the sampling and the corrective measures taken in response. The QA reports will include:

- All results of field audits,
- Problems noted and actions taken during data review, validation, and assessment, and
- Significant QA/QC problems, recommended corrective actions, and the outcome of corrective actions.

4. Data Validation and Usability

This element details the QA activities that will be performed to ensure that the collected data are scientifically defensible, properly documented, of known quality, and meet project objectives. Two steps are completed to ensure that project data quality needs are met:

- Data Verification/Validation.
- Data Usability Assessment.

4.1 Data Review, Verification, and Validation

4.1.1 Field Data Review

The field data verification includes verification of sampling design, sample collection procedures and sample handling. Field data will be reviewed daily by the FTL to ensure that the records are complete, accurate, and legible and to verify that the sampling procedures are in accordance with the protocols specified in the SAP (refer to **Section 4.2.1** for the specific elements reviewed).

4.1.2 Internal Laboratory Review

Prior to the release of any data from the laboratory, the data will be reviewed and approved by laboratory personnel. The review will consist of a tiered approach (**Section 4.2.2**) that will include reviews by the person performing the work, by a qualified peer, and by supervisory and/or QA personnel.

4.1.3 Review of Analytical Data

Upon receipt of the final laboratory data, the Project Chemist will conduct a review of the received laboratory reports. This review will verify completeness, adherence to the analytical specifications, and to identify any potential data usability issues. Issues will be communicated to the Project Chemist or Project Manager, who will be responsible for contacting the laboratory for resolution. Data which is determined to be unusable will be brought to the attention of the Task Manager, who will determine the need for further action.

4.2 Validation and Verification Methods

4.2.1 Field Data Verification

Field records will be reviewed by the FTL to ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good recordkeeping practices (, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained).
- Sample collection, handling, preservation, storage, and shipping procedures were conducted in accordance with the protocols described in the SAP, and that any deviations were documented and approved by the appropriate personnel.

4.2.2 Laboratory Data Verification

Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst who performs a review of the data to ensure the work was done correctly the first time. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete.
- Analytical results are correct and complete.
- All reporting and detection limits are correct.
- The appropriate SOPs have been followed and are identified in the project records.
- Proper documentation procedures have been followed.
- All nonconformances have been documented.

Following the completion of the initial verification by the analyst performing the data reduction, a systematic check of the data will be performed by an experienced peer or supervisor. This check will be performed to ensure that initial review has been completed correctly and thoroughly and will include a review of:

- Adherence to the requested analytical method SOP.
- Correct interpretation of chromatograms, spectra, etc.
- Correctness of numerical input when computer programs are used (checked randomly).
- Correct identification and quantitation of constituents with appropriate qualifiers.
- Numerical correctness of calculations and formulas (checked randomly).
- Acceptability of QC data.
- Documentation that instruments were operating according to method specifications (calibrations, performance checks, etc.)
- Documentation of dilution factors, standard concentrations, etc.
- Sample holding time assessment.

A third-level review will be performed by the Laboratory Project Manager before results are submitted to clients. This review serves to verify the completeness of the data report and to ensure that project requirements are met for the analyses performed.

4.2.3 Validation of Analytical Deliverables

Validation, if performed on a particular data set, will be conducted using the U.S.EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (U.S.EPA, 2020). The guidelines will be modified to reflect any differences in analytical methodology and to incorporate the project-specific acceptance criteria defined in **Section 1.7.2** of this QAPP or the method criteria, whichever is more stringent.

Upon completion of the validation, a report will be prepared. This report will summarize the samples reviewed, elements reviewed, any nonconformances with the established criteria, and validation actions (including application of data qualifiers). Data qualifiers will be consistent with the USEPA guidelines as shown below:

- J = The result is an estimated quantity; the associated numerical value is the approximate concentration of the analyte in the sample.
- J+ = the result is an estimated quantity, but the result may be biased high.
- J- = The result is an estimated quantity, but the result may be biased low.
- UJ = The analyte was not detected above the sample LOQ; and the LOQ is approximate.
- U = The sample was analyzed for, but was not detected above the sample LOQ.
- R = The data are unusable. The sample result is rejected due to serious deficiencies. The presence or absence of the analyte cannot be verified.

4.2.4 Verification during Data Management

Data provided electronically will be spot checked against the hard copy data report during data review and/or validation.

4.3 Usability/Reconciliation with Data Quality Objectives

This element describes how the verified/validated project data will reconcile with the project DQOs, how data quality issues will be addressed and how limitations on the use of the data will be reported and handled. The purpose of this section is to indicate the methods by which it will be ensured that the data collected for this investigation falls in line with the DQOs as described in **Section 1.7.2** of this QAPP.

4.3.1 Comparison to Measurement Criteria

4.3.1.1 Precision Assessment

The RPD, as a measure of variability between the matrix spike and matrix spike duplicate or sample and matrix duplicate (laboratory duplicates), and field duplicates, will be calculated to compare to precision and representativeness objectives. The RPD of duplicate measurements is calculated according to the following formula:

$$RPD = \frac{|\text{Result in Sample 1} - \text{Result in Sample 2}|}{\text{Average (Result in Sample 1 and Result in Sample 2)}} \times 100$$

where:

Sample 1 = Initial sample or spiked sample result

Sample 2 = Duplicate sample or duplicate spiked sample result

In the event of precision results that do not meet the measurement performance criteria established for this project the results will be inspected to determine if the reduced precision can be attributed to sampling techniques (field duplicates) or sample contamination (field and laboratory blanks). If precision has been determined to be affected by sampling or contamination, the data users must decide how to use data near the project action limits that may be affected. Data of reduced precision might be usable with appropriate acknowledgement of the uncertainty associated with results that are near action levels.

4.3.1.2 Accuracy Assessment

Accuracy, as a measure of bias, will be evaluated based on the percent recoveries (%Rs) of the matrix spike sample, matrix spike duplicate sample, surrogates, internal standards, OPR, and

initial and continuing calibration check samples. These QC results will be compared to the project measurement performance criteria for accuracy.

The increase in concentration of the analyte observed in the spiked sample, due to the addition of a known quantity of the analyte, compared to the reported value of the same analyte in the unspiked sample determines the %R.

Percent recoveries for spiked samples and QC are determined using the following equation:

$$\%\ R = \frac{(\text{Result in Spiked Sample} - \text{Result in Original Unspiked Sample})}{\text{Known Amount of Spike Added}} \times 100$$

Percent recoveries for OPR are determined using the following equation:

$$\%\ R = \frac{\text{Result for constituent in OPR}}{\text{Verified amount of constituent in OPR from vendor information}} \times 100$$

Additionally, field and laboratory blanks will be used to evaluate whether field or laboratory procedures represent a possible source of contamination in the samples. Unmonitored contamination can allow false positive results to be reported and treated as true sample components when, in fact, they are not. This type of error will adversely affect the accuracy of the reported results.

4.3.1.3 Completeness Assessment

Completeness is the ratio of the number of valid sample results to the total number of results planned for collection. The goal of this program is to generate valid, usable data. However, in environmental sampling and analysis, some data may be lost due to sampling location logistics, field or laboratory errors, or matrix effects that may cause the rejection of results for some constituents. The overall completeness goal of collection of valid data is 90% for the field and 95% for analytical data. The completeness of the overall data generation will be assessed against the goals of a minimum of 90% as valid and usable results. Valid and usable results are defined as those that are not rejected during review or validation (e.g., due to severe holding time or spike recovery noncompliance) or during the overall assessment (e.g., improper sampling technique). Following completion of the sampling, analysis, and data review/validation, the percent completeness will be calculated and compared to the project objectives stated in **Section 1.7.1** using the following equation.

$$\%\ \text{Completeness} = \frac{\text{Number of valid/usable results obtained}}{\text{Number of valid/usable results planned}} \times 100$$

If this goal is not met, data gaps may exist that will require evaluation to determine the effect on the intended use of the data. Sample reanalysis, analysis of archived material, and/or recollection of the sample may be appropriate depending on criticalness of the missing data logistical constraints, cost, and schedule.

4.3.1.4 Sensitivity

Sensitivity is evaluated by verifying that laboratory quantitation limits meet the expected sensitivity needed to meet all risk based objectives. The failure to calibrate with a standard at the laboratory LOQ or the presence of excessive dilutions may result in elevated detection limits. The effect of these elevated limits will need to be reviewed in light of the historical data and project action levels to determine if adequate information is available to satisfy the project objectives.

4.3.1.5 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary.

4.3.1.6 Measures to Ensure Representativeness of Field Data

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the SAP, work plans, and QAPP are followed and that proper sampling techniques are used.

4.3.1.7 Measures to Ensure Representativeness of Laboratory Data

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, meeting sample holding times, and analyzing and assessing field duplicate samples.

4.3.2 Overall Assessment of Environmental Data

Data assessment will involve data evaluation and usability to determine if the data collected are of the appropriate quality, quantity, and representativeness to the project decision. This evaluation will be performed by the Task Manager in concert with other users of the data. The effect of the qualification of data or loss of data deemed unacceptable for use, for whatever reason, will be discussed and decisions made on corrective action for potential data gaps.

5. References

This QAPP was prepared using the following documents:

U.S. EPA. 1992. *Specifications and Guidance for Contaminant-Free Sample Containers.* United States Environmental Protection Agency, Office of Solid Waste and Emergency Response. December 1992.

U.S. EPA. 1997. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.* Third Edition. United States Environmental Protection Agency. May 1986, revised June 1997 and including all current updates.

U.S. EPA. 2020. *U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review.* EPA 540-R-20-005. United States Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. November 2020.

U.S. EPA. 2006a. *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5.* United States Environmental Protection Agency, Quality Staff. March 2001 (Reissued March 2006).

U.S. EPA. 2006b. *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA QA/G-4. EPA/240/B-06/001. U.S. Environmental Protection Agency. February, 2006.

U.S. EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. EPA 540-R-08-005. U.S. Environmental Protection Agency. January, 2009

Appendix A – Analytical Methods, Detection Limits, and Quality Control Limits

A.1 Analytical Methods, Detections Limits, and Quality Control Limits in Solid Matrices

Table A-1 Target Analytes and Reporting Limits (mg/kg) for pesticides in solids by EPA 8321 Modifed LC/MS/MS

Parameter	CAS No.	LOQ[1]
Abamectin	71751-41-2	0.01
Azoxystrobin	131860-33-8	0.01
Chlorantraniliprole	500008-45-7	0.01
Chlorpyrifos-methyl	5598-13-0	0.01
Clothianidin	210880-92-5	0.01
Difenconazole	119446-68-3	0.01
Fludioxonil	131341-86-1	0.01
Fluoxastrobin	361377-29-9	0.01
Imidacloprid	138261-41-3	0.01
Ipconazole	125225-28-7	0.01
Mefenoxam/Metalaxyl-M	70630-17-0	0.01
Metconazole	125116-23-6	0.01
Sedaxane	874967-67-6	0.01
Tebuconazole	107534-96-3	0.01
Thiabendazole	148-79-8	0.01
Thiamethoxam	153719-23-4	0.01
Trifloxystrobin	141517-21-7	0.01

Table A-2 Quality Control Performance Criteria for Pesticides in Soil Samples by LC/MS/MS

Compound	Blanks	Field Duplicate %RPD	LCS LCL%R[1]	LCS UCL%R[1]	MS LCL%[1]	MSD UCL%[1]
Pesticides by LC/MS/MS Method						
TARGET COMPOUNDS	<1/2 LOQ[2]	50[3]				
Abamectin			60	140	60	140
Azoxystrobin			60	140	60	140
Chlorantraniliprole			60	140	60	140
Chlorpyrifos-methyl			60	140	60	140
Clothianidin			60	140	60	140
Difenconazole			60	140	60	140
Fludioxonil			60	140	60	140
Fluoxastrobin			60	140	60	140
Imidacloprid			60	140	60	140
Ipconazole			60	140	60	140
Mefenoxam/Metalaxyl-M			60	140	60	140
Metconazole			60	140	60	140
Sedaxane			60	140	60	140
Tebuconazole			60	140	60	140
Thiabendazole			60	140	60	140
Thiamethoxam			60	140	60	140
Trifloxystrobin			60	140	60	140
SURROGATES			**ALL SAMPLES LCL%R**	**ALL SAMPLES UCL%R**		
Triphenyl phosphate -d15			60	140		

[1] Laboratory control limits and detection limits are periodically updated. The most current detection and control limits will be utilized at the time of sample analysis. The allowable lower control limit will not be less than 10%.
[2] Blank (field, trip, method) criteria apply to all target compounds analyzed
[3] Field duplicate criteria apply to all target analyte analyzed

Appendix B – Sample Container, Preservation and Holding Time Requirements and Analytical Methodologies

B.1 Summary of Sample Container, Preservation, and Holding Time Requirements

Parameter	Container [1, 2]	Preservation	Holding Time [3]
Aqueous Samples (Equipment Blanks)			
Pesticides by modified EPA 8321B	2 x1L amber glass	6°C	7 days to extraction, 40 days for extract analysis
Biosolids and Soils			
Pesticides by modified EPA 8321B	1x 8 oz amber glass	6°C	14 days to extraction, 40 days for extract analysis

B.2 Preparatory and Analytical Methodologies

Analyte Group[1]	Laboratory Name	Laboratory SOP Number[2]	Method Reference
Soil Analyses			
Pesticides	Matrix Sciences-Oregon Laboratory	SW4-M-0025	AMVAC Method, WRC 88-43 and EPA 8321B